

REMARKS

Applicants' attorney Theresa O'Rourke would like to thank the Examiner for taking time to meet with her on April 20, 2004. Based on said meeting, the following Remarks are submitted for consideration, which add no new matter, and are believed to place the application in condition for allowance.

The Invention

The invention is a solvent-free flexographic printing ink which has a melting point of 75°C or greater, is solid at room temperature and when heated to between 90-135°C is a **molten ink with a viscosity of between 100-1200 cps**. Applicants' flexographic printing ink components are a pigment, thermoplastic binder, wax, solid linear alcohol at room temperature, dispersing agent and optionally, a solid plasticizer.

Rejection Under 35 U.S.C. § 102

Claims 1-4, 8-9, 13, 16, 22 and 28-29 are rejected under 35 U.S.C. §102 as being anticipated by U.S. Patent No. 4,280,939 ("Johnson"). The Examiner opines that Johnson requires or calls for a hot melt ink comprising pigment, copolymer, wax and/or plasticizer, hydrocarbon resin, up to 5% dispersant, and stearyl alcohol. The Examiner further opines that while Johnson does not require a certain melting point for its ink or a molten ink viscosity of 100-1200 cP, Johnson's ink would inherently possess the melting point and molten viscosity of Applicants' ink.

Johnson's thermoplastic ink does not require a dispersing agent as required by Applicants' ink. Further, Johnson's ink has a melt viscosity of "about 50-1000 poises" (see, column 4, line 39) as it is used to decorate vitreous, glass-ceramic and ceramic ware, thus requiring a high viscosity. In contrast, Applicant's flexographic printing ink has a melt viscosity of between **100-1200 cps**.

As Johnson does not disclose all the features of Applicants' flexographic printing ink, Applicants kindly ask that the rejection be withdrawn.

Rejection Under 35 U.S.C. § 103(a)

Claims 5-6 are rejected under 35 U.S.C. §103(a) as being unpatentable over Johnson in view of U.S. Patent No. 5,574,078 ("Elwakil") and U.S. Patent No. 4,853,427 ("Herten et al."). The Examiner opines that Johnson discloses all of the requirements of Applicants' ink however, he does not disclose an ethylene-acrylic acid copolymer. In addition, the Examiner opines that both Elwakil and Herten et al. disclose the use of ethylene-acrylic acid copolymer.

As previously stated, Johnson does not disclose, teach or even suggest all the features of Applicants' flexographic printing ink of claim 1 and this insufficiency continues for dependent claims 5-6. Further, Johnson fails to teach or suggest a dispersing agent or the ink viscosity range of Applicants' ink. Neither Elwakil nor Herten et al. cure these deficiencies.

No dispersing agent is taught as being a component of the ink jet ink of Elwakil or in the molding polymer composition of Herten et al. Further, the viscosity of Elwakil's ink jet ink is "5 to about 30 centipoise at 125°C" (see, column 9, lines 24-25). Herten et al. is silent in regard to an ink viscosity as it is not an ink but rather a polymer composition used in molding, stamping,

calendaring, extrusion, mixing and roll processing processes (see, column 4, lines 23-31). The melting point of Herten et al.'s polymer composition is between 135 and 450°C (see, column 5, lines 6-8), which range is clearly higher than Applicant's melting point of 75°C or greater.

Thus, assuming *arguendo* that one of ordinary skill in the art were to somehow combine the teachings of the thermoplastic ink in Johnson with both the ink jet ink in Elwakil and the molding polymer in Herten et al., the combination thereof would not render Applicants' printing ink obvious due to the failure of the combination to teach or even suggest an ink melt viscosity of between **100-1200 cps** and the use of a **dispersing agent**.

Accordingly, Applicants respectfully request that the rejection be withdrawn.

Rejection Under 35 U.S.C. § 103(a)

Claim 10 is rejected under 35 U.S.C. §103(a) as being unpatentable over Johnson in view of U.S. Patent No. 5,112,398 ("Kruse"). The Examiner opines that Johnson does not disclose the requirement of ethylene-vinyl acetate copolymer comprising 40% vinyl acetate which the Examiner opines is disclosed in Kruse.

As previously stated, Johnson does not disclose, teach or even suggest all the features of Applicants' flexographic printing ink of claim 1 and this insufficiency continues for dependent claim 10. Further, Johnson fails to teach or suggest a dispersing agent or the ink viscosity range of Applicants' ink. Kruse does not cure this deficiency and instead Kruse teaches away from Applicants' flexographic printing ink.

First, Kruse's ink requires a solvent in its ink jet ink (see, column 3, lines 24-68, column 4, lines 1-28) and a dye rather than a pigment (see, column 5, lines 1-34). No dispersing agent is taught. Further of note, the viscosity of Kruse's ink jet ink "at operating temperature [55°C] will be in the range of 10-30 cps, typically 25 cps or lower" (see, column 5, lines 61-24-25). Clearly, Kruse teaches away from Applicants' **solvent-free** printing ink which requires a **pigment** and **dispersing agent** and has a melt viscosity of **between 100-1200 cps**.

Thus, assuming *arguendo* that one of ordinary skill in the art combined the teachings of the thermoplastic ink in Johnson with the ink jet ink in Kruse, the combination thereof would not render Applicants' flexographic printing ink obvious as it is not taught or even suggested. Accordingly, Applicants respectfully request that the rejection be withdrawn.

Rejection Under 35 U.S.C. § 103(a)

Claims 11-12 are rejected under 35 U.S.C. §103(a) as being unpatentable over Johnson in view of U.S. Patent No. 5,593,486 ("Oliver et al."). The Examiner opines that Johnson does not disclose the requirement of a highly branched hydrocarbon wax. The Examiner further opines that Oliver et al. discloses the use of highly branched hydrocarbon wax which would intrinsically possess the softening point and viscosity as claimed.

As previously stated, Johnson does not disclose, teach or even suggest all the features of Applicants' flexographic printing ink of claim 1 and this insufficiency continues for dependent claims 11-12. Further, Johnson fails to teach or suggest a dispersing agent or the ink viscosity range of Applicants' ink. Oliver et al. does not overcome these deficiencies.

Oliver et al. is an ink jet ink and thus the ink viscosity is low. Oliver et al. discloses a melt temperature of 70°C (lower than Applicants' flexographic printing ink **melting point of 75°C or greater**) with viscosity of "from about 1 to about 15 centipoises at the jetting temperature." (See, column 8, lines 23-25).

Thus, assuming *arguendo* that one of ordinary skill in the art combined the teachings of the thermoplastic ink in Johnson with the ink jet ink in Oliver et al., the combination thereof would not render Applicants' flexographic printing ink obvious as it is not taught or even suggested. Accordingly, Applicants respectfully request that the rejection be withdrawn.

Rejection Under 35 U.S.C. § 103(a)

Claims 14-15 are rejected under 35 U.S.C. §103(a) as being unpatentable over Johnson in view of Oliver et al. and *Ethylene Homopolymers-Polywax*. The Examiner opines that Johnson does not disclose the requirement of the claimed specific type of polyethylene wax. The Examiner further opines that Oliver et al. discloses the use of polyethylene wax which *Ethylene Homopolymers-Polywax* describes as possessing molecular weight distribution of approximately 1.1 and melting point of 80-132°C.

As previously stated, Johnson does not disclose, teach or even suggest all the features of Applicants' flexographic printing ink of claim 1 and this insufficiency continues for dependent claims 14-15. Further, Johnson fails to teach or suggest a dispersing agent or the ink viscosity range of Applicants' ink. Neither Oliver et al. nor *Ethylene Homopolymers-Polywax* cure this deficiency.

Oliver et al. is an ink jet ink and thus the ink viscosity is low. Oliver et al. discloses a melt temperature of 70°C with viscosity of "from about 1 to about 15 centipoises at the jetting temperature." (see, column 8, lines 23-25).

Nowhere in *Ethylene Homopolymers-Polywax* is the formulation of a printing ink taught in general, nor are the specific components of Applicants' flexographic printing ink disclosed, but for the polyethylene wax. Further, the viscosity of any printing ink is not disclosed whatsoever, never mind the melt viscosity of Applicants' flexographic printing ink.

Thus, assuming *arguendo* that one of ordinary skill in the art combined the teachings of the thermoplastic ink in Johnson with the ink jet ink in Oliver et al. and the general teaching regarding waxes in *Ethylene Homopolymers-Polywax*, the combination thereof would not render Applicants' flexographic printing ink obvious as it not taught or even suggested. Accordingly, Applicants respectfully request that the rejection be withdrawn.

Rejection Under 35 U.S.C. § 103(a)

Claims 18-20 are rejected under 35 U.S.C. §103(a) as being unpatentable over Johnson in view of either Oliver et al. or U.S. Patent No. 6,106,602 ("Ouchi et al."). The Examiner opines that Johnson does not disclose the requirement of a solid linear alcohol. The Examiner further opines that Oliver et al. disclose the use of solid linear alcohol Unilin 550 which is identical to that used in Applicants' flexographic printing ink and thus would intrinsically possess the hydroxyl number and viscosity as claimed. Alternatively, the Examiner opines that Ouchi et al. disclose the use of alcoholic wax possessing hydroxyl number of 20-150, viscosity of 5-50 mPas at 100-150°C, molecular weight of 200-1500, and melting point of 50-120°C.

As previously stated, Johnson does not disclose, teach or even suggest all the features of Applicants' flexographic printing ink of claim 1 and this insufficiency continues for dependent claims 18-20. Further, Johnson fails to

teach or suggest a dispersing agent or the ink viscosity range of Applicants' ink. Neither Oliver et al. nor Ouchi et al. cure these deficiencies.

Again, Oliver et al. is an ink jet ink and thus the ink viscosity is low. Oliver et al. discloses a melt temperature of 70°C with viscosity of "from about 1 to 15 about centipoises at the jetting temperature." (see, column 8, lines 23-25). Similarly, Ouchi et al. is an ink jet ink and as stated by the Examiner has a melt viscosity of "from about 50 to 50 mPas, preferably from 5 to 30 mPas, at temperatures from 100 to 150°C which are operating temperatures of an ink jet head." (See, column 4, lines 8-10).

Thus, assuming *arguendo* that one of ordinary skill in the art combined the teachings of the thermoplastic ink in Johnson with either of two other ink jet inks in Oliver et al. or Ouchi et al., the combination thereof would not render Applicants' flexographic printing ink obvious as it not taught or even suggested. Accordingly, Applicants respectfully request that the rejection be withdrawn.

Rejection Under 35 U.S.C. § 103(a)

Claim 17 is rejected under 35 U.S.C. §103(a) as being unpatentable over Johnson in view of U.S. Patent No. 5,560,765 ("Sawada"). The Examiner opines that while Johnson discloses the use of animal wax, it does not disclose the requirement of the claimed specific type of animal wax. The Examiner further opines that Sawada discloses the use of spermaceti wax to control ink viscosity.

As previously stated, Johnson does not disclose, teach or even suggest all the features of Applicants' flexographic printing ink of claim 1 and this insufficiency continues for dependent claim 17. Further, Johnson fails to teach or suggest a dispersing agent or the ink viscosity range of Applicants' ink. Sawada does not cure this deficiency.

Sawada is an ink jet ink and thus the ink viscosity is low. Sawada also requires use of a dye (see, column 5, lines 45-60) rather than the **pigment** of Applicants' flexographic printing ink. Finally, no dispersing agent is disclosed in the ink jet ink of Sawada.

Thus, assuming *arguendo* that one of ordinary skill in the art combined the teachings of the thermoplastic ink in Johnson with the ink jet ink in Sawada, the combination thereof would not render Applicants' flexographic printing ink obvious as it not taught or even suggested. Accordingly, Applicants respectfully request that the rejection be withdrawn.

Rejection Under 35 U.S.C. § 103(a)

Claim 21 is rejected under 35 U.S.C. §103(a) as being unpatentable over Johnson in view of U.S. Patent No. 6,645,282 ("Stone et al.").

Applicants' hereby state that Stone et al. was commonly owned at the time of the present invention and thus should be removed as a reference under 35 U.S.C. §103 (see, Official Gazette Notice of April 11, 2000, 1233 OG 54).

Accordingly, the rejection should be withdrawn as Stone is not available as a reference.

Rejection Under 35 U.S.C. § 103(a)

Claim 23 is rejected under 35 U.S.C. §103(a) as being unpatentable over Johnson in view of U.S. Patent No. 4,889,560 ("Jaeger et al."). The Examiner opines that while Johnson discloses the use of plasticizer, it does not disclose

the requirement of a the claimed specific type of plasticizer. The Examiner further opines that Jaeger et al. disclose the use of dicyclohexyl phthalate plasticizer.

As previously stated, Johnson does not disclose, teach or even suggest all the features of Applicants' flexographic printing ink of claim 1 and this insufficiency continues for dependent claim 23. Further, Johnson fails to teach or suggest a dispersing agent or the ink viscosity range of Applicants' ink. Jaeger et al. does not overcome this deficiency.

Jaeger et al. is an ink jet ink and thus the ink viscosity is low. Jaeger et al. disclose a viscosity at 150°C of "from about 5 to 30 cps, and more preferably from about 9 to 12 cps." (see, column 6, lines 21-23). Jaeger et al. also requires a dye (see, column 6, lines 36-37) rather than the **pigment** of Applicants' flexographic printing ink. Finally, no dispersing agent is disclosed in the ink jet ink of Jaeger et al.

Thus, assuming *arguendo* that one of ordinary skill in the art combined the teachings of the thermoplastic ink in Johnson with the ink jet ink in Jaeger et al., the combination thereof would not render Applicants' flexographic printing ink obvious as it not taught or even suggested. Accordingly, Applicants respectfully request that the rejection be withdrawn.

Rejection Under 35 U.S.C. § 103(a)

Claims 30-31 are rejected under 35 U.S.C. §103(a) as being unpatentable over Johnson in view U.S. Patent No. 6,283,031 ("Kakuta et al."). The Examiner opines that Johnson does not disclose the requirement of heating the substrate before printing followed by cooling the substrate after printing. The Examiner further opines that Kakuta et al. disclose heating the substrate before printing to

optimize the shape of the ink dots and while there is no disclosure to cool afterward, the Examiner opines that this step would have been obvious.

As previously stated, Johnson does not disclose, teach or even suggest all the features of Applicants' flexographic printing ink of claim 1 and this insufficiency continues for dependent claims 30-31. Further, Johnson fails to teach or suggest a dispersing agent or the ink viscosity range of Applicants' ink. Kakuta et al. do not cure this deficiency.

Kakuta et al. describe a solid-ink printing plate used for offset printing (lithographic and web offset printing) and method for producing same, as well as the solid-ink used on this plate. The solid-ink used on Kakuta et al.'s plate is ink jetted onto the printing plate at "a viscosity of 10 to 30 mPa*s when it is being jetted". (See, column 5, lines 44-45). Finally, no dispersing agent is disclosed in the ink jet ink of Kakuta et al.

Thus, assuming *arguendo* that one of ordinary skill in the art combined the teachings of the thermoplastic ink in Johnson with the ink jet ink used on offset printing plates in Kakuta et al., the combination thereof would not render Applicants' flexographic printing ink obvious as it not taught or even suggested. Accordingly, Applicants respectfully request that the rejection be withdrawn.

Rejection Under 35 U.S.C. § 103(a)

Claims 24-25 are rejected under 35 U.S.C. §103(a) as being unpatentable over Johnson in view of Elwakil, Oliver et al., Stone et al., and Jaeger et al.

Applicants' hereby restate that Stone et al. was commonly owned at the time of the present invention and thus should be removed as a rejection under 35

U.S.C. §103. Accordingly, the rejection should be withdrawn as Stone et al. is not available as a reference.

Rejection Under 35 U.S.C. § 103(a)

Claims 26-27 are rejected under 35 U.S.C. §103(a) as being unpatentable over Johnson in view of Stone et al. and Jaeger et al.

Applicants' hereby restate that Stone et al. was commonly owned at the time of the present invention and thus should be removed as a rejection under 35 U.S.C. §103. Accordingly, the rejection should be withdrawn as Stone et al. is not available as a reference.

Rejection Under 35 U.S.C. § 103(a)

Claims 1-2, 13, 18-23, 28-29 and 32-36 are rejected under 35 U.S.C. §103(a) as being unpatentable over Stone et al. in view of either Oliver et al. and Ouchi et al.

Applicants' hereby restate that Stone et al. was commonly owned at the time of the present invention and thus should be removed as a rejection under 35 U.S.C. §103. Accordingly, the rejection should be withdrawn as Stone et al. is not available as a reference.

Rejection Under 35 U.S.C. § 103(a)

Claims 11-12 are rejected under 35 U.S.C. §103(a) as being unpatentable over Stone et al. in view of either Ouchi et al. or Oliver et al. as applied to claims 1-2, 13, 18-23, 28-29 and 32-36 above, and further in view of Oliver et al.

Applicants' hereby restate that Stone et al. was commonly owned at the time of the present invention and thus should be removed as a rejection under 35 U.S.C. §103. Accordingly, the rejection should be withdrawn as Stone et al. is not available as a reference.

Rejection Under 35 U.S.C. § 103(a)

Claims 14-15 are rejected under 35 U.S.C. §103(a) as being unpatentable over Stone et al. in view of either Ouchi et al. or Oliver et al. as applied to claims 1-2, 13, 18-23, 28-29 and 32-36 above, and further in view of Oliver et al. and *Ethylene Homopolymers-Polywax*.

Applicants' hereby restate that Stone et al. was commonly owned at the time of the present invention and thus should be removed as a rejection under 35 U.S.C. §103. Accordingly, the rejection should be withdrawn as Stone et al. is not available as a reference.

Rejection Under 35 U.S.C. § 103(a)

Claims 30-31 are rejected under 35 U.S.C. §103(a) as being unpatentable over Stone et al. in view of either Ouchi et al. or Oliver et al. as applied to claims 1-2, 13, 18-23, 28-29 and 32-36 above, and further in view of Stone et al. in view of Kakuta et al.

Applicants' hereby restate that Stone et al. was commonly owned at the time of the present invention and thus should be removed as a rejection under 35

U.S.C. §103. Accordingly, the rejection should be withdrawn as Stone et al. is not available as a reference.

Conclusion

Applicants believe that the Remarks provided herein adequately and completely address the rejections raised by the Examiner. It is therefore respectfully submitted that the claims are now in condition-for-allowance.

Respectfully submitted,



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